

INTERACTIVE PROGRAM SUMMARY PANEL**CROSS REFERENCE TO RELATED APPLICATION**

This application is continuation of pending Application No. 08/969,979,
5 filed November 13, 1997, now allowed, which was a continuation of Application
No. 08/435,117, filed May 5, 1995, now abandoned.

FIELD OF THE INVENTION

The present invention relates to interactive television or televideo systems
and, in particular, to a method of providing viewers with information about
10 programming available on such systems.

BACKGROUND OF THE INVENTION

Conventional cable and satellite television transmission is evolving into
interactive television or televideo (IT) systems. IT systems combine the video
broadcast capability characteristic of conventional broadcast television with
15 computer-executed applications or programming responsive to input from viewers.

By some estimates, IT systems under development could include the equivalent of
500 channels of programming, including video broadcasting and applications.

Meaningful access to large amounts of interactive television programming
will require that viewers be able to obtain and comprehend vast amounts of
20 programming and scheduling information. Conventional printed programming
guides, such as T.V. Guide magazine or local newspapers, already provide only
incomplete programming information for cable television networks with as few as
50 channels. It is expected that complete printed programming guides for the
large amounts of programming in IT systems would be very large and expensive
25 and unacceptably cumbersome.

Some conventional cable television networks dedicate a channel to a

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programming guide service, such as the Prevue Channel, Prevue Express, and Prevue Express Plus services provided by Prevue Networks, Inc. This conventional type of programming service lists the titles of programs scheduled for selected times. Typically, the titles of programs scheduled for about four
5 television channels over a period of about two hours are listed simultaneously.

The service automatically scrolls through all or most of the channels available on the cable television network and automatically shifts the two-hour scheduling period shown according to the actual time. The same program schedule is delivered to all viewers on the cable television network. Viewers
10 passively view the program schedule as it is scrolled.

In some systems, only about 60% of a viewer's television screen is used to show the program schedule. The remaining screen portion is used as an advertising window dedicated to broadcasting selected advertising or service identifications. One service that is frequently advertised in the advertising
15 window of a programming guide is pay-per-view (PPV) television. Advertisements for PPV services often include video clips or segments relating to programs (e.g., motion pictures) available from the service.

The video content of the advertising window is the same for all viewers and is independent of the program schedule information that is shown simultaneously.
20 The video content of the advertising window and the program schedule may even be generated from independent media or sources and mixed for broadcast on the dedicated programming guide channel.

At least one available system provides viewers with limited supplemental text descriptions regarding programming listed on a television program schedule.
25 The system requires the viewer to have special decoder equipment to intercept and

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decode television program schedule information that is transmitted automatically during the vertical blanking interval of a conventional television signal.

Only a limited amount of television program schedule information may be encoded and broadcast during each vertical blanking interval. Many automatic

5 transmissions of this type are required to deliver all the program schedule information and supplemental text descriptions to the decoder equipment, where the decoded information is stored. The program schedule information and supplemental text descriptions can be displayed and viewed on demand after being loaded into the decoder equipment.

10 Transmitting the program information only automatically during the vertical blanking signal of a conventional television signal requires that the many fragments of program information be assembled over time in the viewer's decoder equipment. As a consequence, this system is limited to providing only brief text descriptions of programs and improves only slightly upon conventional program
15 listings. Moreover, the supplemental text descriptions provided by this system obscure much of the program schedule information and therefore requires that the viewer switch between viewing the program schedule information and the supplemental text descriptions.

Conventional cable television program guide services provide only the title
20 or brief test descriptions of the scheduled programming. Such extremely limited information typically requires supplementation by a printed video guide for a viewer to obtain meaningful program schedule information. In view of the expected shortcomings of printed schedule guides for IT systems and the limited information provided by conventional cable television program guides, IT systems
25 will require improved methods of providing program information to viewers.

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SUMMARY OF THE INVENTION

The present invention includes a method of displaying for a viewer summary information relating to programming available on an interactive television or teletext system. The IT system includes a central control node that delivers programming to multiple subscribers or viewers. Each viewer has a video display set (e.g., a television receiver) and an associated interactive controller that is responsive to input from the viewer for controlling programming on the video display set.

With reference to a preferred embodiment, the method of this invention includes obtaining a viewer selection indication corresponding to a program selected by the viewer from a programming guide. Based on the viewer selection indication, the IT system accesses summary information relating specifically to the program selected by the viewer. The summary information preferably includes a text description of the programming and display imagery relating to the programming. The display imagery may include a still video image or a multi-frame video sequence of or relating to the programming, together with an associated audio segment. The display imagery could also include the programming as it is being broadcast.

The text description and the display imagery are rendered on the display screen of the viewer's television receiver in a program summary panel that is positioned adjacent the programming guide from which the user selected the programming. The program summary panel includes a video preview window and a separate text window within which the respective display imagery and text description are rendered. The text window may also include one or more icons indicating that the program has selected characteristics. The associated audio

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segment preferably relates to the selected programming.

The present invention provides detailed information about scheduled programming for an arbitrary number of programming channels. No printed scheduling information is required. The availability of multi-frame video previews or direct broadcast transmissions provides programming information that viewers have not previously been able to obtain for selected programming.

The foregoing and other features and advantages of preferred embodiments of the present invention will be more readily apparent from the following detailed description, which proceeds with reference to the accompanying drawings.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of an interactive television system used for the preferred embodiment of this invention.

FIG. 2 is a block diagram of an interactive station controller used for the preferred embodiment of this invention.

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FIGS. 3A and 3B are respective block and stylized diagrams of a video display screen with a programming guide and a program summary panel of the present invention for summarizing selected programming.

FIG. 4 is a plan diagram of a viewer control unit for providing viewer input to the interactive station controller of FIG. 2.

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FIG. 5 is a flow diagram of an interactive method of summarizing selected programming according to the present invention.

FIG. 6 is a diagram of a portion of a video display screen with exemplary icons for use in the program summary panel of FIG. 3.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

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FIGS. 1 and 2 are directed to an interactive television or televideo (IT)

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system 10 as an operating environment for preferred embodiments of the present invention. For purposes of simplicity and clarity, IT system 10 is described with reference to widely available systems and standards, including conventional analog television receivers and cable-based video networks.

5 It will be appreciated, however, that the particular components of IT system
10 may be implemented with a variety of conventions, standards, or technologies
without departing from the underlying concepts of the present invention. The
term televideo is used to emphasize the applicability of this invention beyond
standard television-based systems. As two examples, the conventional analog
10 television receivers and cable-based video network referred to in FIGS. 1 and 2
could be implemented as digital video receivers and a satellite downlink
transmission system, respectively.

FIG. 1 is a simplified block diagram of an interactive televideo (IT) system 10 having a central control node 12 that transmits programming over a network 14 to multiple viewer stations (e.g., homes) 16. The programming may include standard analog video broadcasts (e.g., NTSC, PAL or SECAM), digital or digitally encoded video broadcasts (e.g., MPEG1 or MPEG2), or digital information related to computer-executed applications.

Each viewer station 16 includes at least one video display set 18 (e.g., a television receiver) and an interactive station controller 20, which is sometimes referred to as a set-top box. Although it is shown distinct from video display set 18, interactive station controller 20 could alternatively be integral with video display set 18.

Interactive station controllers 20 receive programming from central control
25 node 12 and control the associated video display sets 18 in accordance with the

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programming. Controlling video display set 18 of a conventional analog type may include, for example, delivering an analog video signal directly to video display set 18 for display, converting a digital video signal to a suitable analog form for display, or executing a computer application that includes displays on display set

5 18.

Interactive station controllers 20 transmit digital information to and receive digital information from central control node 12. The digital information typically relates to applications executed by processors residing at control node 12 and station controller 20, as described below in greater detail.

10 Preferably, network 14 carries bidirectional communication between station controllers 20 and central control node 12. Alternatively, communication between station controllers 20 and central control node 12 can be carried by different communication systems. For example, programming from central control node 12 to station controllers 20 could be carried on a satellite downlink while station
15 controllers 20 send information to central control node 12 on a terrestrial modem link. An exemplary embodiment of central control node 12 is described in greater detail below.

FIG. 2 is a simplified block diagram of an exemplary one of interactive station controllers 20 for controlling video display set 18 and communicating with
20 central control node 12. Station controller 20 includes an input 60 that delivers communication or information from central control node 12 to a communication interpretation system 62 having, for example, an analog television demodulator 62a, a digital video decoder 62b, and a digital network communication interface 62c.

25 Demodulator 62a functions as a conventional television tuner for selecting

09228005-010899

5 . communicates with central control node 12 with digital information carried over baseband frequencies. The baseband frequencies may be below the conventional analog video signal frequencies, above the digital video signal frequencies, or between the frequencies of analog or digital video signals.

controls operation of station controller 20. CPU 66 is responsive to an infrared receiver and decoder system 70 that receives user input from a hand-held viewer control unit 71 (FIG. 4) and delivers the input to CPU 66. For example, CPU 66 controls selection of analog- or digital-based programming or applications delivered from central control node 12, accesses, activates, or executes selected applications, or delivers information to or requests information from central control node 12.

A graphics subsystem 72 is controlled by CPU 66 to form graphics images, including interactive system user interface images, on video display set 18. A video processor subsystem 74, also controlled by CPU 66, provides control in the rendering of video imagery, including decompressing digital video signals and sizing and positioning a video display window. A mixer 76 receives a video display signal from video processor subsystem 74 and graphics image signals from graphics subsystem 70 and delivers a mixed image signal to video display set 18. Mixer 76 provides compositing, masking and blending of display signals from two or more image sources such as, for example, a digital video signal and locally-

generated graphics or an analog video signal and a bitmap image received from central control node 12.

FIGS. 3A and 3B show a display screen 78 of one of video display sets 18 with a program summary panel 80 of the present invention rendered thereon.

- 5 Program summary panel 80 preferably is displayed in conjunction with a programming guide 82 that displays programming available for a particular date over a selected time range. Programming guide 82 includes a channel panel 84 identifying multiple particular channels or services (e.g., four channels or services), a time panel 86 listing particular times (e.g., a two hour time period in
10 30 minute increments), and a program grid 87 of program tiles 88 listing titles of programming on the identified channels at the listed times.

Referring to FIG. 4, viewer control unit 71 includes an infrared transmitter window 89 through which control unit 71 emits infrared signals to infrared input
70 of station controller 20. A directional control keypad 90 allows a viewer to
15 transmit signals for moving a cursor (i.e., an indication of position) between tiles 88 on programming grid 86.

The cursor may be rendered on display screen 78 as a graphic character or icon or by changing the graphic characteristics of the program tile 88 where the cursor is positioned. The programming identified in a program tile 88 to which a
20 viewer moves the cursor indication is referred to as being focused upon by the viewer or as focussed programming. The viewer may initiate or activate selections by depressing an action key 91 and may enter numeric values with numeric key pad 92.

Interactive station controller 20 generates a program summary panel 80 of
25 the present invention for the programming focused upon by a viewer. Program

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summary panel 80 includes a preview display window 94 within which interactive station controller 20 renders display imagery relating the focussed programming. The display imagery may include currently available video programming, an on-demand video clip or segment, or a still image, as described below in greater detail.

A text description window 96 displays a program title (preferably of a distinct font), a text description of the program, and one or more information icons relating to selected characteristics of the programming. Preferably, station controller 20 also provides an audio segment related to the selected programming.

FIG. 5 is a flow diagram showing an interactive method of displaying a summary of programming available on IT system 10.

Process block 100 indicates that program schedule information for a predetermined period is retrieved by interactive station controller 20 from an electronic programming guide (EPG) database 102 in central control node 12.

15 The program schedule information includes, for example, program titles, broadcast times, and assigned channels, for a period of, for example, twenty-four hours. Interactive station controller 20 stores the program schedule information in memory system 68. Interactive station controller 20 preferably retrieves the program schedule information upon startup and at periodic intervals after startup.

20 Process block 104 indicates that interactive station controller 20 displays a programming guide 82 on video display set 18. Preferably, central processing unit 66 cooperates with graphics subsystem 72 and the program schedule information stored in memory system 68 to render a graphic programming guide 82 of the type shown in Fig. 3.

25 **Process block 108 indicates that a viewer selects or focuses upon a program**

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tile 88 in programming guide 82 as described above, for example.

Process block 110 indicates that interactive station controller 20 accesses summary information about the programming focused upon by the viewer.

Process block 114 indicates that a summary text description of the selected programming and pointers to icons summarizing any selected information about the programming is retrieved from a memory included in IT system 10.

Preferably, station controller 20 periodically (e.g., daily or weekly) receives from EPG database 102 summary text descriptions and related icon bitmaps for a predetermined time period and stores them in memory system 68. Station

controller 20 retrieves from memory system 68 summary text descriptions and related bitmaps of any icons pointed to and displays the icons and summary text description for the viewer.

Alternatively, station controller 20 can retrieve from EPG database 102 the summary text descriptions and related bitmaps of icons that are not available in local memory 68 for the program tile 88 selected or focused upon by the viewer. Circumstances in which the summary text descriptions and related bitmaps of icons would not be available in local memory 68 include, for example, the viewer selecting a program tile 88 outside the predetermined time period for which the information is stored in memory 68, a video, graphic, or audio segment being associated with the information, or the information in memory 68 requiring an update or correction.

Decision block 116 represents an inquiry as to whether the selected programming is currently being broadcast and available to the user. Availability of the selected programming relates, for example, to whether the viewer is a subscriber to the selected programming. Decision block 116 proceeds to process

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block 118 whenever the selected program is currently being broadcast and available to the user and otherwise proceeds to process block 120.

Process block 118 indicates that communication system 62 tunes to the selected programming and displays it on video display set 18 within preview display window 94 of program summary panel 80. Video processor subsystem 74 functions to size and position the selected programming within preview display window 94.

Process block 122 indicates that central control node 12 retrieves preview media information from EPG database 102 or, alternatively, from memory 68 of station controller 20. The preview media information indicates whether the preview or display imagery available for the selected programming includes a video clip or segment of or relating to the selected program or a still image of or relating to the selected programming.

Decision block 128 represents an inquiry as to whether a digitized preview video clip or segment is available for the selected programming. Decision block 128 proceeds to process block 130 whenever a digitized video clip or segment is available and otherwise proceeds to process block 132.

Process block 130 indicates that the digitized video clip or segment is cued from an electronic programming guide (EPG) preview server computer at central control node 12 and transmitted to interactive station controller 20 for display to the viewer.

Preferably, the digitized video segment relates to the specific episode of the selected programming. If an episode-specific segment is not available, the digitized video segment preferably relates to any program series of which the selected programming episode is a part. If a series-specific segment is not

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available, the digitized video segment preferably relates to the channel carrying or broadcasting the selected programming.

Process block 132 indicates that a digitized still image is retrieved from EPG database 102 and transmitted to interactive station controller 20 for display to the viewer. Preferably, the still image relates to the specific episode of the selected programming. If an episode-specific still image is not available, the digitized still image preferably relates to any program series of which the selected programming episode is a part. If a series-specific still image is not available, the digitized still image preferably relates to the channel carrying or broadcasting the selected programming.

Decision block 134 represents an inquiry as to whether the viewer has selected or focused on a different program tile 88. Decision block 134 returns to process block 110 if the viewer has selected or focused on a different program tile 88 and otherwise proceeds to end block 136.

A digitized audio segment may be retrieved from EPG database 102 for playing with each digital video segment or still image. The audio segment may include one or more of a voice announcement, an audio portion of the selected programming, or music. The accessing and retrieval of audio segments would be substantially the same as the accessing and retrieval of still images or digitized video segments.

Preferably, the audio segment relates to the specific episode of the selected programming. If an episode-specific segment is not available, the digitized audio segment preferably relates to any program series of which the selected programming episode is a part. If a series-specific segment is not available, the digitized audio segment preferably relates to the channel carrying or broadcasting

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the selected programming.

5 (ms-B2) The method described above is directed to an IT system 10 in which selected information is stored at and retrieved from EPG database 102 or EPG preview server 131 at central control node 12. The benefits of the present invention could also be achieved in IT systems having some or all of the selected information stored at and retrieved from interactive station controllers.

The availability of text description, information icons, and display imagery for use in program summary panel 80 is based upon an electronic programming guide (EPG) database managed within central control node 12, as described below
10 in greater detail. The EPG database preferably includes the following tables:

- i) an episode table containing records for each interactive or broadcast
televideo episode;
- ii) a series table containing records for each interactive or broadcast series;
- iii) a still image table comprising bitmaps or vector graphic definitions of
15 still-image previews or pointers to computer files containing such still-image
previews;
- iv) an audio table containing digitized audio digital wave synthesis
definitions or MIDI (Musical Instrument Digital Interface) note and timing
definitions of music and voice-over previews or pointers to computer files
20 containing such audio previews;
- v) an audio/video table containing digitized video and audio, either in
MPEG, AVI, Quicktime or other digital video format for full-motion video
and audio storage, or pointers to computer files containing such video
previews;
- 25 vi) a tuning information table containing broadcast, cablecast or satellite

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transmission tuning information for channel lineups available to viewers,
including network and affiliation information; and

vii) a programming characteristic table containing broadcast properties or
characteristics such as closed captioning and viewer discretion advised,

5 which include pointers to image definitions of associated descriptive icons.

Within the EPG database, each programming event or episode record is
linked to a parent series record. One-time programming events or specials have a
single episode record linked to a single series record. Each episode record can
have pointers to episode preview or display imagery in still image, audio, or

10 multi-frame digital video format. Each episode may also be linked to selected
broadcast properties that identify selected characteristics of the episode.

Similarly, each series record may have pointers to previews or display
imagery relating to the series in still image, audio, or multi-frame digital video
format, or selected broadcast properties that identify selected characteristics of the
15 series. Also, each channel record may have pointers to previews or display
imagery relating to the channel in still image, audio, or multi-frame digital video
format, or selected broadcast properties that identify selected characteristics of the
channel. The term channel refers to a provider of programming and can include,
for example, a broadcast network or an application provider.

20 Retrieval of text description, information icons, and preview display imagery
entails correlating the programming selected or focused upon by the viewer with
the corresponding episode record. Any pointers in the record to program
summary information are tracked and the information is retrieved. If no pointers
to program summary information are associated with the episode, the

25 programming selected by the viewer is correlated with the corresponding series

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record in the series table. Any pointers to series-specific program summary information are tracked and the information is retrieved.

If the series record contains no pointers to program summary information, a default still image or graphic retrieved for rendering within preview window 94.

- 5 The default still image may be a channel-specific image or graphic for the channel carrying or transmitting the selected programming or a predetermined IT system or EPG image or graphic.

vlma.B37 Table 1 below lists the preferred display imagery rendered in preview display window 94 of program summary panel 92 for different types of programming on IT system 10. The display imagery in preview display window 94 preferably is the currently broadcasting programming for focused programming available to the viewer. Programming available to the viewer includes the programming to which the viewer subscribes, including premium programming ~~services~~.

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TABLE 1

Type of Service/ Channel Selected	Broadcast Preview	Continuous Media Server Preview	Still Preview
Audio on demand	NO	If bandwidth available	YES
Current or future PPV broadcast	If limited in some way (for example timed preview, disabled audio or alternate audio track)	If bandwidth available	Likely
Current broadcast (not PPV)	Always	NO	NO
Electronic Program Guide	NO	NO	YES
Future broadcast (not PPV)	NO	First choice if bandwidth available	Second choice
Interactive service	NO	First choice if bandwidth available	Second choice
Past broadcast (PPV/Continuous Media Server archive)	NO	First choice if bandwidth available	Second choice
NVOD service	First choice - asynchronous loop	NO	Second choice - still carousel
VOD service	NO	First choice if bandwidth available	Second choice

Rendering the selected programming in preview display window 94 could also be used in connection with current or future pay-per-view (PPV) broadcasts,

5 if the preview were limited until the viewer elects or subscribes to the broadcast.

An asynchronous loop of broadcast previews could be rendered in preview display window 94 for near-video-on-demand (NVOD) services.

An asynchronous loop of broadcast previews could include non-specific

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video segments or trailers, or service advertisements, delivered simultaneously to all viewers and thus requiring no media server load or dedicated media server channels. A broadcast preview could be implemented for each of the other listed services with an asynchronous loop of broadcast previews carried on a dedicated
5 channel.

Video clips or segments of multiple frames would preferably be rendered in preview display window 94 for future non-PPV broadcasts, interactive services such as news-on-demand or an interactive game service, past broadcast services, video-on-demand (VOD) services, and if, bandwidth is available on network 14,
10 audio-on-demand and current or future PPV broadcasts. In connection with all types of service, still images could be rendered in preview display window 92 as a system backup or due to limited system capability.

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200.34/ Fig. 6 is a front view of a display screen 78 of an exemplary video display set 18 showing icons 150 that are selectively rendered individually or together
15 within the text description window 94 of program summary panel 90. It will be appreciated that icons 150 are exemplary and that different icons representing the same or different information may be used in accordance with the present invention.

A VCR record icon 152 indicates that the selected program has been cued by
20 the viewer for future recording by a video cassette recorder (VCR) at the viewer's station 16. A reminder icon 154 indicates that the selected program has been cued by the viewer for generating a reminder briefly before the start of the program. A re-run icon 156 indicates that the selected program is a re-run (i.e., a re-broadcast) of a first-run program series.

25 Closed captioning icon 158 indicates that the selected programming includes

closed captioning text for hearing-impaired viewers. Audience rating icon 160 (as shown as an exemplary PG-13 rating) represents an audience rating applied to a motion picture by the Motion Picture Advisory Association, or other indications such as "viewer discretion advised". Awards icon 162 indicates that the selected programming is an award program such as, for example, the motion picture Academy Awards. Star rating icons 164 represent critical ratings as applied, typically, to motion pictures.

Stereo icon 166 identifies the selected programming as including a stereo audio component. Live icon 168 indicates that the selected program is a live broadcast. Premium icon 170 indicates that the selected programming is a part of a premium or surcharge service available over network 14. Interactive icon 172 identifies the selected programming as an interactive show or service. In addition to icons 150, it will be appreciated that other icons could be used to identify selections of interactive system services, specialized audio capabilities (e.g., Dolby® or THX®), or customized program-specific icons identifying, for example, college or professional sports.

Preferably, icons 150 are stored at central control node 12 as bitmap files and downloaded to interactive station controller 20 in response to pointers or other indicators associated with the text summary description information. Icons 150 are generated within text description window 94 in cooperation with graphics subsystem 72 of station controller 20.

Referring to FIG. 1 central control node 12 includes a digital local area network (LAN) 200 with multiple computer servers 202 for performing various interactive system applications or functions. Servers 202 include, for example, multiple state-of-the art microprocessors that operate in parallel and access or

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control data storage devices with large data capacities. A digital communication gateway 204 couples LAN 200 to a wide area network (WAN) (not shown) for obtaining and delivering IT system information.

Servers 202 may include, for example, service and application servers 202a
5 and continuous media servers 202b. Service and application servers 202a process interactive service requests from subscribers and provide services and applications associated with operation of IT system 10. Service and application servers 202a may be dedicated to particular applications such as an electronic programming guide for viewers, network security, monitoring, object storage, financial
10 transactions, data access, and other administration functions.

Continuous media servers 202b provide storage and on-demand or near on-demand delivery of digitized video information. The digitized video information can include video programming of substantially any duration ranging from individual image frames and brief video clips to full-length motion pictures.

15 Servers 202 communicate with station controllers 12 via a network communication switch 208, such as an asynchronous transfer node (ATM) switch. For communication from servers 202 to station controllers 20, network communication switch 208 arranges digital information received from servers 202 in a standard bidirectional digital communication format for transmission over
20 network 14. For communication from station controllers 12 to servers 202, network communication switch 208 converts digital information from the standard bidirectional digital communication format for delivery to servers 202.

Digital information from servers 202 is frequency modulated by a digital modulator system 210 for transmission over network 14. Digital information that
25 includes video programming is preferably modulated at frequencies greater than

09228005-010899

the standard analog television frequency range, which is 50-450 MHz under the NTSC television standard. Digital information that does not include video programming may be modulated at baseband frequencies that are less than the standard analog television frequency range.

- 5 A multiplexing system 212 receives and mixes the frequency modulated digital information from modulator system 210 and standard analog video signals obtained from a standard analog video feed 214 and delivers an IT composite signal to interactive network 14. Analog video feed may be or include a satellite downlink, a cable receiver, or any locally generated programming. A reverse
- 10 channel receiver system 218 receives and demodulates digital communications from station controller 20 for processing by servers 202.

- Having illustrated and described the principles of the present invention in a preferred embodiment, it should be apparent to those skilled in the art that the embodiment can be modified in arrangement and detail without departing from
- 15 such principles. Accordingly, we claim as our invention all such embodiments as come within the scope and spirit of the following claims and equivalents thereto.

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